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Abstract

This paper empirically investigates the firm-level relationship between the local input share and the number of used FTAs by employing the data on FTA utilization in Japanese affiliates in ASEAN. As a result, we do not find a robust linear relationship. However, affiliates using a large number of FTAs (seven or eight) have an extremely higher share of local inputs. This result might be interpreted as the first evidence of the "spaghetti bowl phenomenon".

Keywords: FTA; spaghetti bowl phenomenon
JEL classification: F15; F53; O53

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Abstract: This paper empirically investigates the firm-level relationship between the local input share and the number of used FTAs by employing the data on FTA utilization in Japanese affiliates in ASEAN. As a result, we do not find a robust linear relationship. However, affiliates using a large number of FTAs (seven or eight) have an extremely higher share of local inputs. This result might be interpreted as the first evidence of the "spaghetti bowl phenomenon".

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Highlights

- It is examined as to whether users of multiple FTAs have a higher local input share.
- We employ the firm-level data on FTA utilization in Japanese affiliates in ASEAN.
- We find that users of seven/eight FTAs have a 20%-30% higher share of local inputs.

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1. Introduction

The surge of free trade agreements (FTAs) in each country has publicly yielded concerns on firms' inactive use of FTAs. According to the World Trade Organization (WTO) website, as of January 2012, around 500 regional trade agreements have been notified to the WTO. In order to use FTA schemes, firms need to meet the rules of origin (ROOs). To do that, the users may need to change their procurement sources from the optimal pattern of procurement. In particular, for the use of multiple FTA schemes, firms may raise the share of local inputs in total inputs because local inputs can always meet ROOs in any kinds of FTAs. If so, though the net benefits from such multiple-FTA use must be positive, some amount of benefits will be offset by the change of procurement sources from the optimal pattern of procurement. We may say that this offset is one form of the "spaghetti bowl phenomenon".[1]

This paper empirically investigates whether the use of multiple FTAs forces firms to raise their local input share in total inputs. To do that, we employ the unique dataset, which has been collected by the Japan External Trade Organization (JETRO) in 2011 and 2012. In that survey, the very detailed firm-level information on FTA use is available according to FTA partner countries, in addition to some basic information on firms' activities such as employment, the breakdown of their export destinations, and their procurement sources. In the academic literature on FTAs, there are few studies on firm-level FTA utilization. Demidova and Krishna (2008) is the theoretical study which demonstrates that only the productive firms can use FTA schemes in exporting. To our best knowledge, Takahashi and Urata (2010) is the only empirical study at the firm level. They examine FTA usage by Japanese firms at the firm level by employing a questionnaire survey, finding that larger firms are more likely to use FTA schemes. Against this literature on firm-level FTA utilization, our paper is the first one that examines the firm-level use of multiple-FTAs.

The rest of this paper is organized as follows. The next section explains our data structure and presents an overview on firms' use of multiple FTAs. After providing the results of econometric analysis in Section 3, we discuss the relationship of firms' multiple-FTA use with their local input share in Section 4.

2. Data Issues

As mentioned in the introductory section, our main data source is JETRO's "Survey of Japanese-Affiliated Firms in ASEAN" for 2010 and 2011. For example, in

[1] As for the more precise concept of the spaghetti bowl phenomenon, see Bhagwati et al. (1998).

the survey for 2010, the questionnaires were sent to 4,164 Japanese affiliates operating in seven ASEAN countries (Thailand, Malaysia, Singapore, Indonesia, the Philippines, Vietnam, and Myanmar), receiving 1,865 valid responses. Of those, 1,111 were from Japanese affiliates in the manufacturing industry. Our use of foreign plants' data enables us to avoid including firms not using FTA schemes because of their lack of knowledge on what FTAs are. Firms that invest abroad will have enough knowledge on FTAs because such companies are familiar with international activities and are also sensitive to the available tools in those activities. In short, foreign plants are more likely to behave rationally in their decisions on FTA use.

Our focus on affiliates in ASEAN countries enables us to control for heterogeneity in rules of FTAs (e.g. ROOs) to some extent because ASEAN countries try to harmonize their respective FTAs among ASEAN members. In addition to the ASEAN Free Trade Area (AFTA), as of our sample period, ASEAN countries have bilateral or multilateral FTAs with Australia, China, India, Japan, Korea, and New Zealand. Also, while Malaysia concludes its FTA with Pakistan, Singapore does so on its FTAs with Chile, Peru, and the United States. As a result, according to countries in which affiliates locate, the number of their potentially available FTAs is different. The sample affiliates for our analysis are restricted only to those in the manufacturing industry.[2]

Next, we make an overview of affiliates' use of FTAs. Figure 1 depicts the number of affiliates according to the number of FTAs that they use, indicating that nearly 70% of sample affiliates are non-users of FTAs. Table 1 reports the relationship between the average employment and the number of FTAs that an affiliate uses. In the "All" column, we cannot find its clear relationship. Such an unclear relationship can be seen even when taking a look at the relationship by country. Table 2 reports the relationship between the average share of local inputs and the number of FTAs that an affiliate uses. In the "All" column, affiliates using more than five FTA schemes seem to have a relatively high share of local inputs. We may find a relatively clear positive relationship in Singapore.

=== Figure 1 & Tables 1-2 ===

[2] The industry classification in this dataset is rough; food industry, textile industry, wearing apparel, wooden products, furniture, paper industry, chemical industry, plastic products, medicine, rubber products, pottery, iron and steel, non-metallic mineral products, metal products, general machinery industry, electric machinery industry, transport equipment, precision machinery industry, and other manufacturing sectors.

3. Econometric Results

This section reports our econometric results on the relationship between firms' local input share and the number of FTAs that they use. The results of ordinary least square (OLS) estimation are provided in Table 3. We also introduce logs of affiliate employment and age into the equation to be estimated, in addition to industry dummy and country-year dummy. These two kinds of dummy variables will control for the difference in difficulty to meet the ROOs across industries and the difference in the number of potentially available FTAs among countries, respectively.

=== Table 3 ===

From this OLS result, as is consistent with our expectation, we can see that the number of FTAs has a significant association with the local input share. Also, affiliate age has a significant coefficient: The older affiliates are more likely to have a higher share of local inputs perhaps because of their greater knowledge on local suppliers. The firm size in terms of employment does not significantly affect the local input share.[3] Next, we apply the instrument variable method to our model in order to take care of the simultaneity problem between local input share and the number of used FTAs. We use the number of destinations to which affiliates export as an instrument, which seems to be related to the number of used FTAs but not at least directly to the local input share. The results are reported in Table 3. The coefficient for the number of used FTAs turns out to be insignificant. The other interesting finding is that both the affiliate size and the number of export destinations are positively associated with the number of used FTAs.

In the above analyses, we did not find a robust linear relationship between the local input share and the number of FTAs. Finally, in order to investigate its non-linear relationship, we introduce dummy variables according to the number of used FTAs instead of its continuous variable. The results are reported in Table 4, indicating that affiliates using more than six FTA schemes have a 20%-30% higher share of local inputs than do non-users of FTA schemes and the other affiliates, except for affiliates using three FTA schemes. The results on the other variables (i.e. employment and age) are not changed qualitatively.

=== Table 4 ===

[3] We also estimate this model by the fractional logit technique, but the results are qualitatively unchanged. For the easier interpretation on marginal effect, we report only OLS results.

4. Discussion

Our findings for the analysis of Japanese affiliates in ASEAN are that there is no robust linear relationship between the local input share and the number of FTAs, but that affiliates using an extremely large number of FTAs in our sample have a high share of local inputs. In sum, when firms use so many FTA schemes at the same time, they may need to raise their local input share so as to meet ROOs in all FTA schemes. In this sense, some amount of benefits from the use of multiple FTAs is offset by the change of procurement sources from the optimal pattern of procurement.

Against this, there are two noteworthy points. First, we need to investigate our hypothesis with a larger number of sample firms. As confirmed in Figure 1, the number of affiliates using seven or eight FTA schemes is less than 1% of our sample affiliates. Second, this weak evidence on the rise of local input share might be specific to FTAs concluded by ASEAN countries. As pointed out in Cadot and de Melo (2007), ROOs in their FTAs are much less restrictive than those in other FTAs existing in the world. Thus, it is important to investigate the same kind of hypothesis for the other regions, including America.

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Table 1. Average Employment according to Number of Used FTAs

Number of Used FTAs	IDN	KHM	LAO	MMR	MYS	PHL	SGP	THA	VNM	All
0	966	128	60	439	393	899	265	599	752	615
1	1,406	350	440	875	457	1,322	187	413	471	597
2	1,268	601		600	429	1,019	214	759	691	742
3	688				610	584	71	1,394	674	917
4	360				405		259	2,738	1,625	1,553
5	364				719		141	1,812	515	994
6					4,135		264	550		1,492
7					1,274		113	3,102		998
8					89		95			93

Source: Survey of Japanese-Affiliated Firms in ASEAN, India, and Oceania (JETRO)

Table 2. Average Share of Local Inputs according to Number of Used FTAs (%)

Number of Used FTAs	IDN	KHM	LAO	MMR	MYS	PHL	SGP	THA	VNM	All
0	0.41	0.12	0.00	0.06	0.42	0.29	0.23	0.54	0.27	0.44
1	0.38	0.30	0.00	0.01	0.43	0.22	0.31	0.56	0.28	0.45
2	0.44	0.01		1.00	0.43	0.21	0.26	0.52	0.20	0.44
3	0.64				0.48	0.22	0.53	0.58	0.23	0.49
4	0.35				0.40		0.42	0.51	0.07	0.42
5	0.90				0.31		0.76	0.47	0.08	0.44
6					0.68		0.63	0.57		0.62
7					0.51		0.75	0.50		0.63
8					0.37		0.82			0.64

Source: Survey of Japanese-Affiliated Firms in ASEAN, India, and Oceania (JETRO)

Table 3. Baseline Estimation

Estimation Method	OLS	Insrument Variable Method	
Dependent Variable	Local Input Share	Number of FTAs	Local Input Share
Number of FTAs	0.011*		0.031
	[0.006]		[0.024]
ln Employment	0.0003	0.117***	-0.003
	[0.006]	[0.020]	[0.007]
ln Age	0.032***	0.049	0.032***
	[0.012]	[0.040]	[0.012]
Number of Export Destination		0.183***	
		[0.021]	
Industry Dummy	YES	YES	YES
Country * Year Dummy	YES	YES	YES
Observations	2,090	2,090	2,090
R-squared	0.1913	0.1830	0.1868

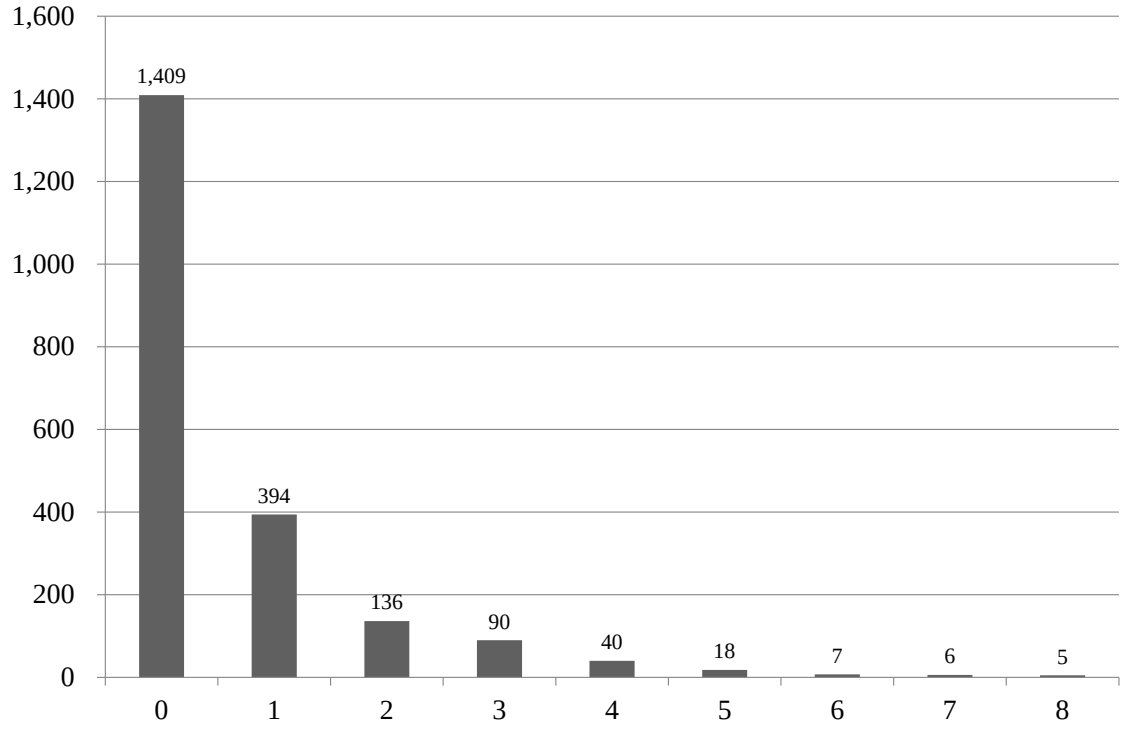
Notes: The parentheses are robust standard errors. *** and ** show 1% and 5% significance, respectively.

Table 4. OLS Estimation according to Number of FTAs

	Coef.	R.S.E.
Number of FTAs		
= 1	-0.020	[0.017]
= 2	-0.038	[0.024]
= 3	0.059**	[0.030]
= 4	-0.016	[0.045]
= 5	0.058	[0.075]
= 6	0.167	[0.125]
= 7	0.200*	[0.110]
= 8	0.314**	[0.159]
ln Employment	-0.0002	[0.006]
ln Age	0.036***	[0.012]
Dummy Variables		
Industry	YES	
Country * Year	YES	
Observations	2,090	
R-squared	0.1968	

Notes: The dependent variable is a share of local inputs in total inputs. R.S.E. indicates robust standard errors. *** and ** show 1% and 5% significance, respectively.

Figure 1. Number of Sample Affiliates according to the Number of FTAs



Source: Survey of Japanese-Affiliated Firms in ASEAN, India, and Oceania (JETRO)